

## CLAIMS

We claim:

1. A system for automatic configuration upon installation of a network printer, wherein the network printer is associated with printer description files, a driver, a spooler, and a port monitor, the system comprising:
  - bi-directional application program interfaces associated with the spooler for allowing the driver to generate a bi-directional request and a bi-directional response;
  - a syntax within the printer description files for representing and associating the bi-directional request and the bi-directional response with a print feature;
  - extension files stored in the driver for relating bi-directional values and printer values;
  - and
  - a notification infrastructure controlled by the port monitor for providing a bi-directional notification of configuration changes to the driver and selected applications.
2. The system of claim 1, wherein the notification infrastructure includes a drive printer event mechanism for informing the driver of a configuration change.
3. The system of claim 1, wherein the notification infrastructure includes a find next printer change notification for allowing an application to monitor and receive configuration changes automatically.
4. The system of claim 1, wherein the syntax additionally comprises a plurality of keywords including a response type keyword for designating a bi-directional response type and a response data keyword for mapping between features of the network printer.

5. The system of claim 1, wherein the syntax provides tools for providing updates at a global level, at an option level, and at a feature level.

6. The system of claim 1, further comprising independent hardware vendor extensions for enumerating specific features provided by a manufacturer.

7. The system of claim 1, wherein the bi-directional application program interfaces provide tools for supporting a get action, a set action, and an enumerate action.

8. The system of claim 1, wherein port monitor includes a mechanism for retrieving data from a network printer database and for accessing the extension files to transform the data.

9. The system of claim 8, wherein the bi-directional application program interfaces provide a mechanism for returning the data retrieved by the port monitor.

10. A system for facilitating client retrieval of bi-directional information upon installation of a network device, the system comprising:

a set of bi-directional constructs within a printer description file;

a port monitor for receiving the bi-directional constructs, for retrieving data from the network device in accordance with the bi-directional constructs, transforming the data into an appropriate format, creating a channel, and sending the transformed data; and

a spooler including a mechanism for receiving installation notifications over the created channel from the port monitor and routing the installation notifications to selected applications.

11. The system of claim 10, wherein spooler comprises a drive printer event mechanism for informing a driver of a configuration change.

12. The system of claim 10, wherein the spooler comprises a find next printer change notification for allowing an application to monitor and receive configuration changes automatically.

13. The system of claim 10, wherein the set of bi-directional constructs includes a bi-directional query construct and a bi-directional response construct

14. The system of claim 13, wherein the printer description file comprises a plurality of keywords including a response type keyword for designating a bi-directional response type and a response data keyword for mapping between features of the network printer.

15. The system of claim 14, wherein the bi-directional constructs and the keywords form a syntax providing tools for making automatic updates at a global level, at an option level, and at a feature level.

16. The system of claim 10, further comprising independent hardware vendor extensions for enumerating specific features provided by a manufacturer.

17. The system of claim 10, further comprising bi-directional application program interfaces within the spooler for allowing transmittal of a bi-directional request and a bi-directional response.

18. The system of claim 17, wherein the bi-directional application program interfaces provide tools for supporting a get action, a set action, and an enumerate action.

19. The system of claim 10, wherein the port monitor includes a mechanism for retrieving data from a network printer database and for accessing extension files within a driver to transform the retrieved data.

20. The system of claim 19, wherein the bi-directional application program interfaces provide a mechanism for returning the data retrieved by the port monitor.

21. A method for automatically configuring a system upon installation of a network printer within the system, wherein the system includes printer description files, a driver, a spooler, and a port monitor, the method comprising:

getting a list of installable features and corresponding bi-directional requests from the printer description files;

calling bi-directional application program interfaces from the spooler to query for a current configuration of the installable features;

mapping bi-directional schema to a printer-specific protocol;

generating and routing a bi-directional notification;  
mapping bi-directional responses to a feature from the printer description file; and  
updating an application with a current configuration.

22. The method of claim 21, wherein routing a bi-directional notification comprises routing a drive printer event notification to the driver to inform the driver of a configuration change.

23. The method of claim 21, wherein routing a bi-directional notification comprises routing a find next printer change notification to an application to allow the application to monitor and receive configuration changes automatically.

24. The method of claim 21, further comprising implementing a plurality of keywords including a response type keyword for designating a bi-directional response type and a response data keyword for mapping between features of the network printer.

25. The method of claim 21, further comprising providing automatic configuration updates at a global level, at an option level, and at a feature level.

26. The method claim 21, further comprising implementing independent hardware vendor extensions for enumerating specific features provided by a manufacturer.

27. The method of claim 21, further comprising implementing the bi-directional application program interfaces to provide tools for supporting a get action, a set action, and an enumerate action.

28. The method of claim 21, further comprising using the port monitor for retrieving data from a network printer database and accessing extension files from the printer description files in order to transform the data.

29. The method of claim 28, further comprising using the bi-directional application program interfaces for returning the data retrieved by the port monitor.

30. A computer-readable medium having computer-executable instructions for performing the method recited in claim 21.

31. A method for providing extensibility for a port monitor in order to enable vendors to define new mappings using existing public bi-directional schema and extensions to existing schema, the method comprising:

    permitting use of an extension file capable of describing a mapping between bi-directional values and device-specific objects; and

    allowing implementation of the extension file to facilitate a port monitor response to a bi-directional request.

32. The method of claim 31, wherein the extension file is an XML extension file.

33. The method of claim 31, wherein the extension file comprises independent hardware vendor extensions of standard bi-directional schema.